Land Processes Distributed Active Archive (LP DAAC)

DATA RETENTION – What is Archived? What Services are Available?

LP DAAC User Working Group
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Introduction (1)

- Through the passage of the Land Remote Sensing Policy Act of 1992 (P.L. 102–555), Congress endorsed the need for continuous monitoring of the Earth and maintaining a readily available record of information displaying the status of the Nation's resources and environment.

  - The Act requires the Department of the Interior (DOI) to establish a permanent Government archive, the National Satellite Land Remote Sensing Data Archive (NSLRSDA), containing satellite remote sensing data of the Earth's land surface -- and to make these data easily accessible and readily available for study.

Introduction (2)

- The U.S. National Space Policy (NSPD 49), dated August 31, 2006, provides further guidance:

  "The Secretary of the Interior, through the Director of the U.S. Geological Survey, shall collect, archive, process, and distribute land surface data to the United States Government and other users and determine operational requirements for land surface data."

Introduction (3)

- This role was reconfirmed in the new National Space Policy, released on June 28, 2010, which states:

  - "The Secretary of the Interior, through the Director of the United States Geological Survey (USGS), shall:

  - Conduct research on natural and human-induced changes to Earth's land, land cover, and inland surface waters, and manage a global land surface data national archive and its distribution;

  - Determine the operational requirements for collection, processing, archiving, and distribution of land surface data to the United States Government and other users; and

  - Be responsible, in coordination with the Secretary of Defense, the Secretary of Homeland Security, and the Director of National Intelligence, for providing remote sensing information related to the environment and disasters that is acquired from national security space systems to other civil government agencies.

  - In support of these critical needs, the Secretary of the Interior, through the Director of the USGS, and the NASA Administrator shall work together in maintaining a program for operational land remote sensing observations."

Stewardship

- Definition - a person who manages another's property; one who administers anything as the agent of another

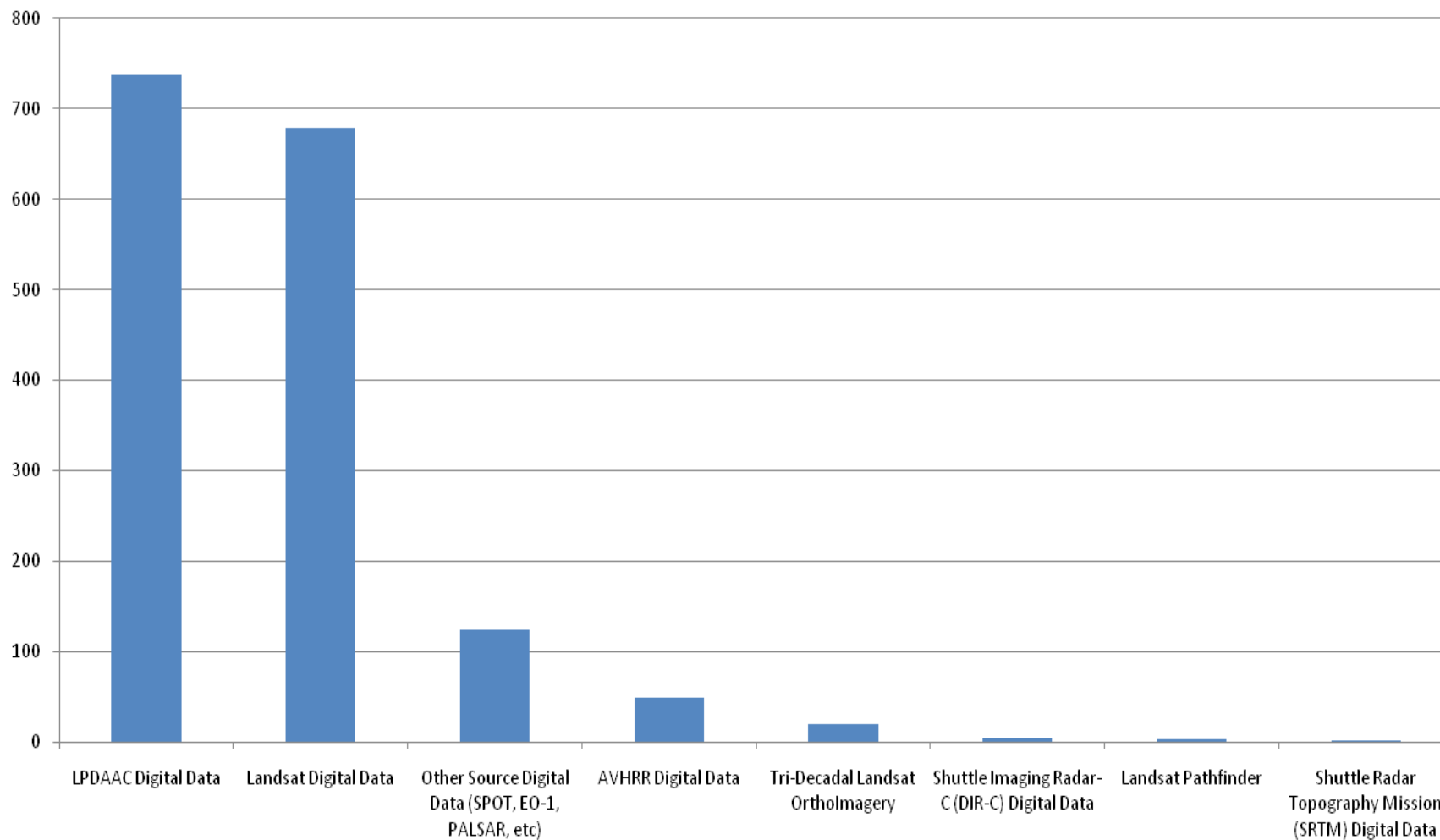- Increase the use and value of Earth science data and information

Long Term Archive Planning?

- USGS LRS has given guidance to develop a Long Term Archive plan for MODIS & ASTER data by January 2011
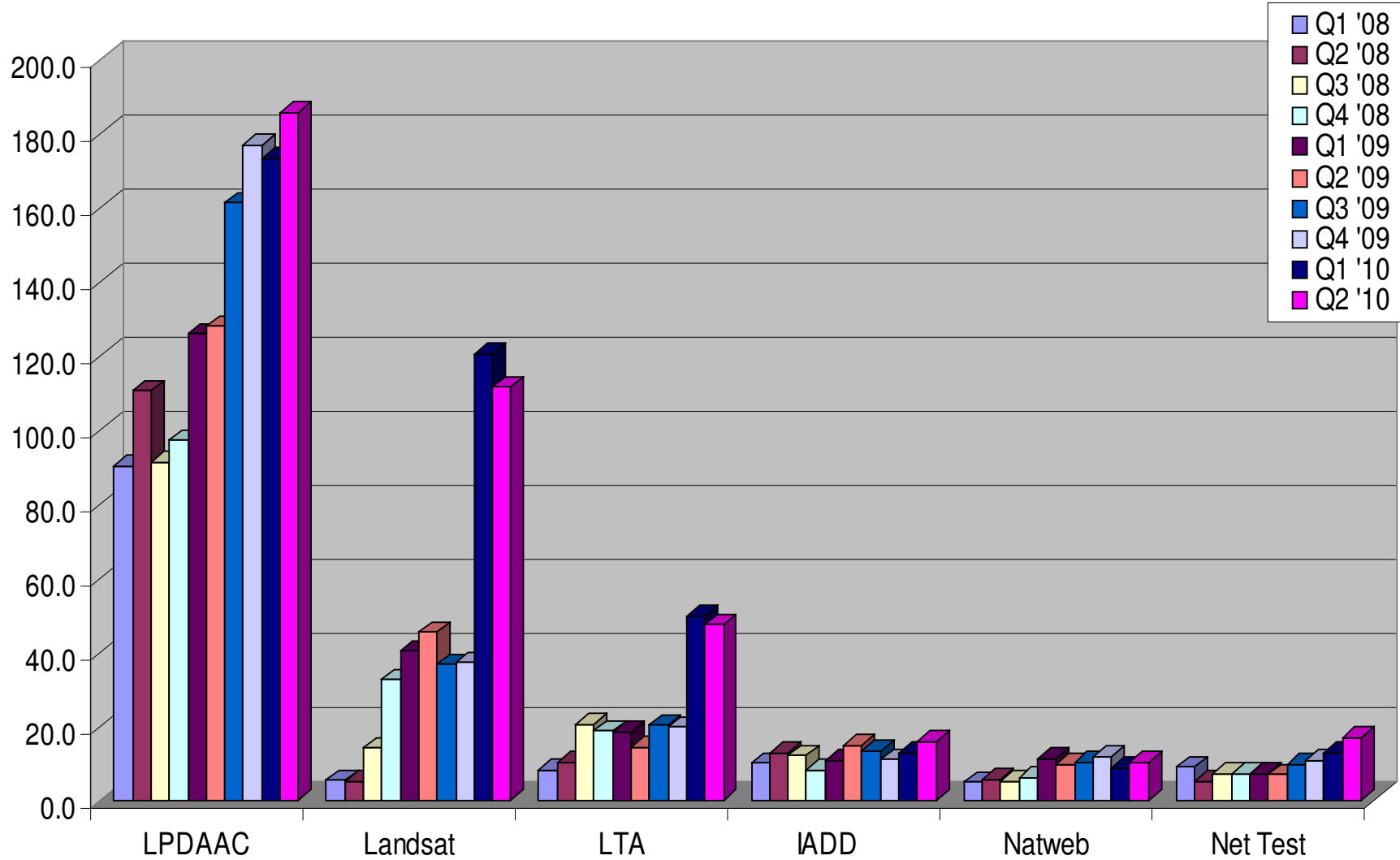
EROS Land Remote Sensing Archive Data Volumes (TB)
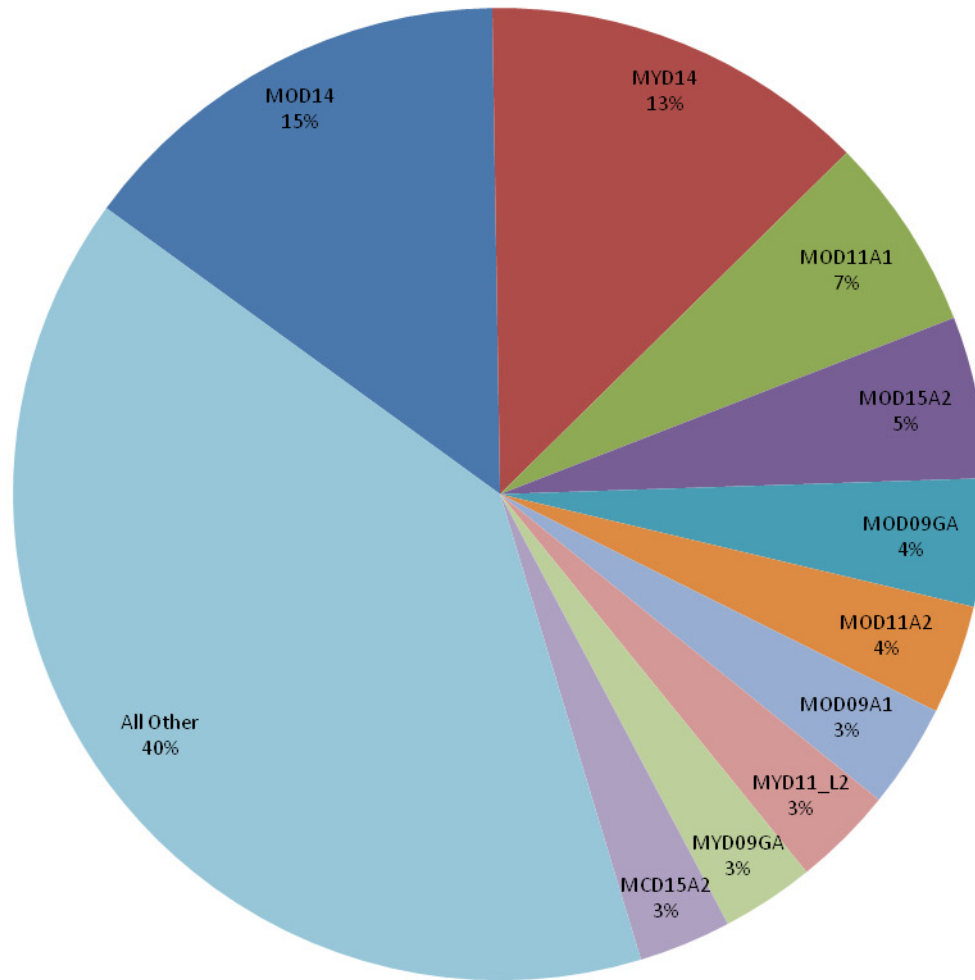

Source: EROS Records Management Report, Q3 2010

EROS Distribution Metrics

Outbound Traffic by Project by Qtr in TB

FY10 MODIS Product Popularity

Product	Count	Percent
MOD14	4,841,909	15%
MYD14	4,227,738	13%
MOD11A1	2,128,986	6%
MOD15A2	1,766,299	5%
MOD09GA	1,394,047	4%
MOD11A2	1,191,991	4%
MOD09A1	1,135,121	3%
MYD11_L2	1,101,057	3%
MYD09GA	1,013,186	3%
MCD15A2	1,011,433	3%
MCD43B3	892,318	3%
MYD11A1	891,554	3%
MOD09GQ	873,361	3%
MOD13A2	827,651	3%
MCD43A4	685,344	2%
MOD17A2	679,072	2%
MOD13Q1	672,015	2%
MOD14A2	590,361	2%
MOD09Q1	526,917	2%
MOD11_L2	497,013	2%

Note: all other products had 1% or less distribution

FY10 ASTER Product Popularity
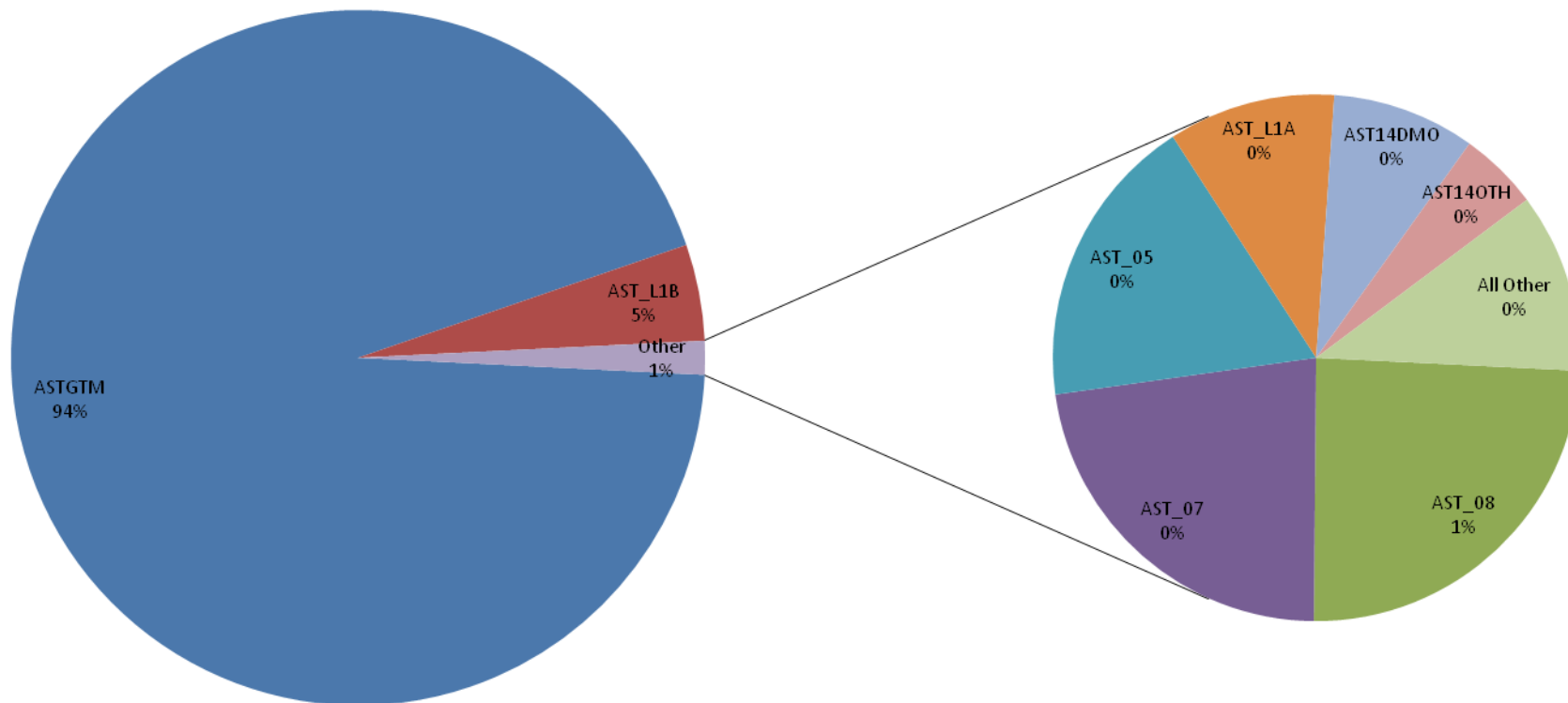
~~AST_07~~	~~16,152~~	~~0.4%~~
AST_05	8,143	0.3%
AST_L1A	4,622	0.2%
AST14DMO	3,956	0.1%
AST14OTH	2,196	0.1%

Note: all other products had 0.1% or less distribution

Process of Developing Long Term Archiving Plan

ASTER & MODIS Science Teams

Implementation Complete

NASA/ ESDIS LPDAAC

Long term Archive plan development

NASA USGS

USGS Long Term Archive

Fall 2010

LP DAAC UWG

January 2011

End of Mission +4 years
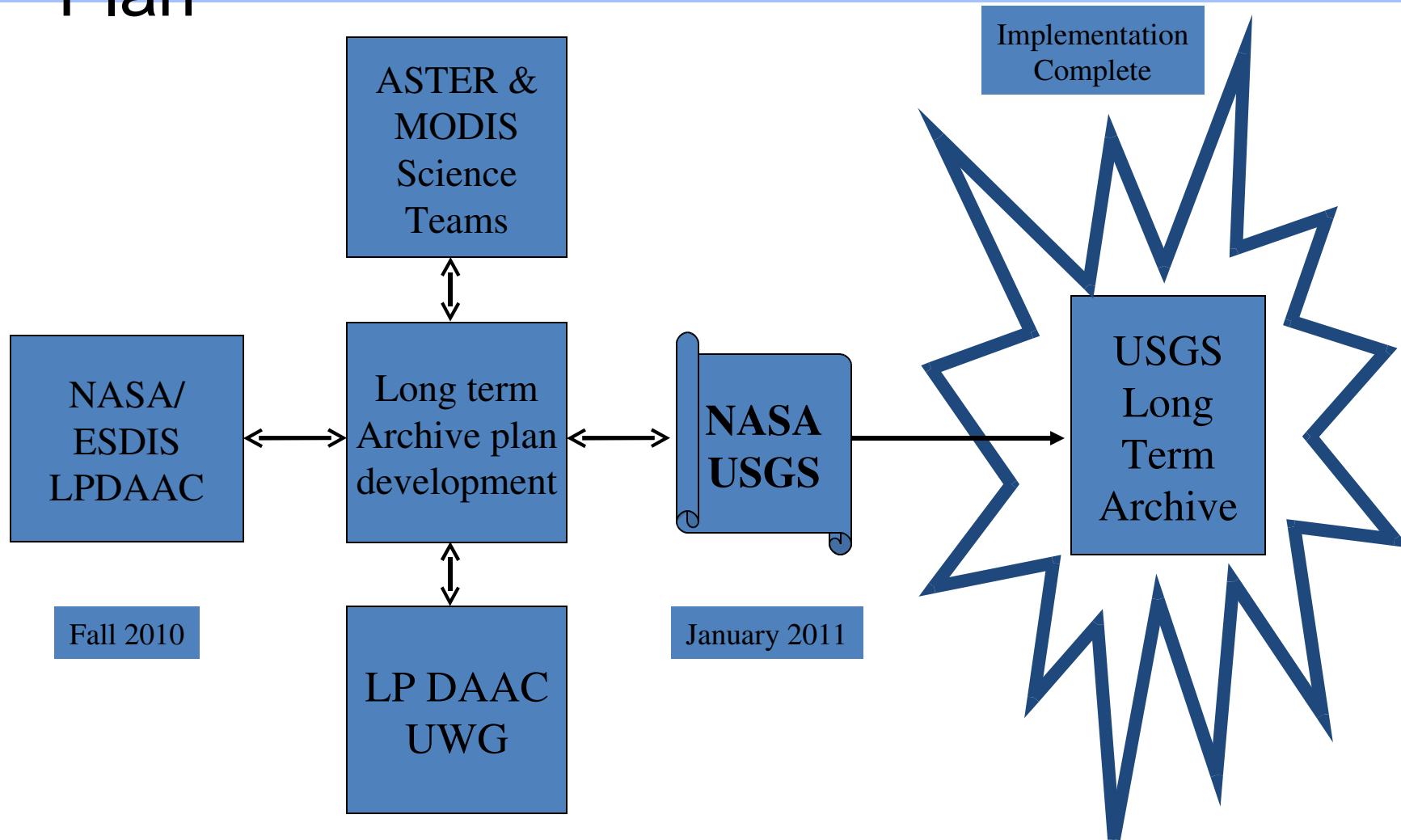
Data Retention Goals

- Scope:
  - What products/versions should be retained
  - Reproducibility
    - Algorithms, Algorithm Theoretical Basis Document (ATBD's), PGE's, user documentation, etc.
    - External dependencies
      - lower-level data at other institutions
      - Ancillary data required for processing
    - Persistent identification (such as digital object identifiers)
      - How to use?
      - What level of granularity?

ASTER Use Case

Case 1
Archive all existing data (Level_1A) and maintain product generation system for Level_1b and higher level products (AST_05, AST_07, AST_09 etc). The problem with this position will be maintaining the code to generate Level_1B and higher level data products. **High cost**

Case 2
At the end of the mission (i.e. when the instrument dies) generate Level_1B and higher level products from the Level_1A archive and archive all the products. **Medium cost**

Case 3
Just archive the Level_1A and ability to generate the Level_1B and documents for generating the higher level data products. Again the problem will be maintaining the L1A to L1B code. **Low cost**

Case 4
Just archive the Level_1B data. The problem with this approach is if we want to go back and recalibrate for any particular reason it will be difficult, if not impossible, since the radiometric and geometric coefficients will have been applied. **Low cost**
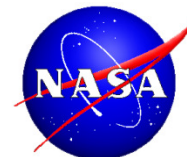
ASTER Science Team recommendation

- Case 2: Generate L1B and higher products from L1A, and archive all products.
  - Products, user documentation, compliant metadata.
  - Reproducibility? If so:
    - ATBDs, PGEs/source code
    - Ancillary info (calibration, atmospheric correction, geo-location)
    - Any interagency or intergovernmental agreements necessary to distribute the above
    - COTS ? (SILCast)
  - Pushes ASTER archive up beyond 1 PB

MODIS Version 5/6/7

- Strategy in the past has been to make the products available as they are processed and ready
- For V6, the product suite will be released all at once
  - December 2011
- Plan is to keep V5 around for at least one year past the availability of V6? (permanently?)
- Follow the same plan for V7?

Future of MODIS

- As with ASTER:
  - Which products/levels/versions?
  - Reproducibility
  - Levels of service?

Discussion Topic

What happens at end of mission for ASTER & MODIS?

- What products or services should be offered?

- Example:

  - Are all products available on-line?

  - Enabling full product suite reproduction?

    - e.g., lower-level data, ATBDs, PGEs, documentation, etc.

Distribution Metrics
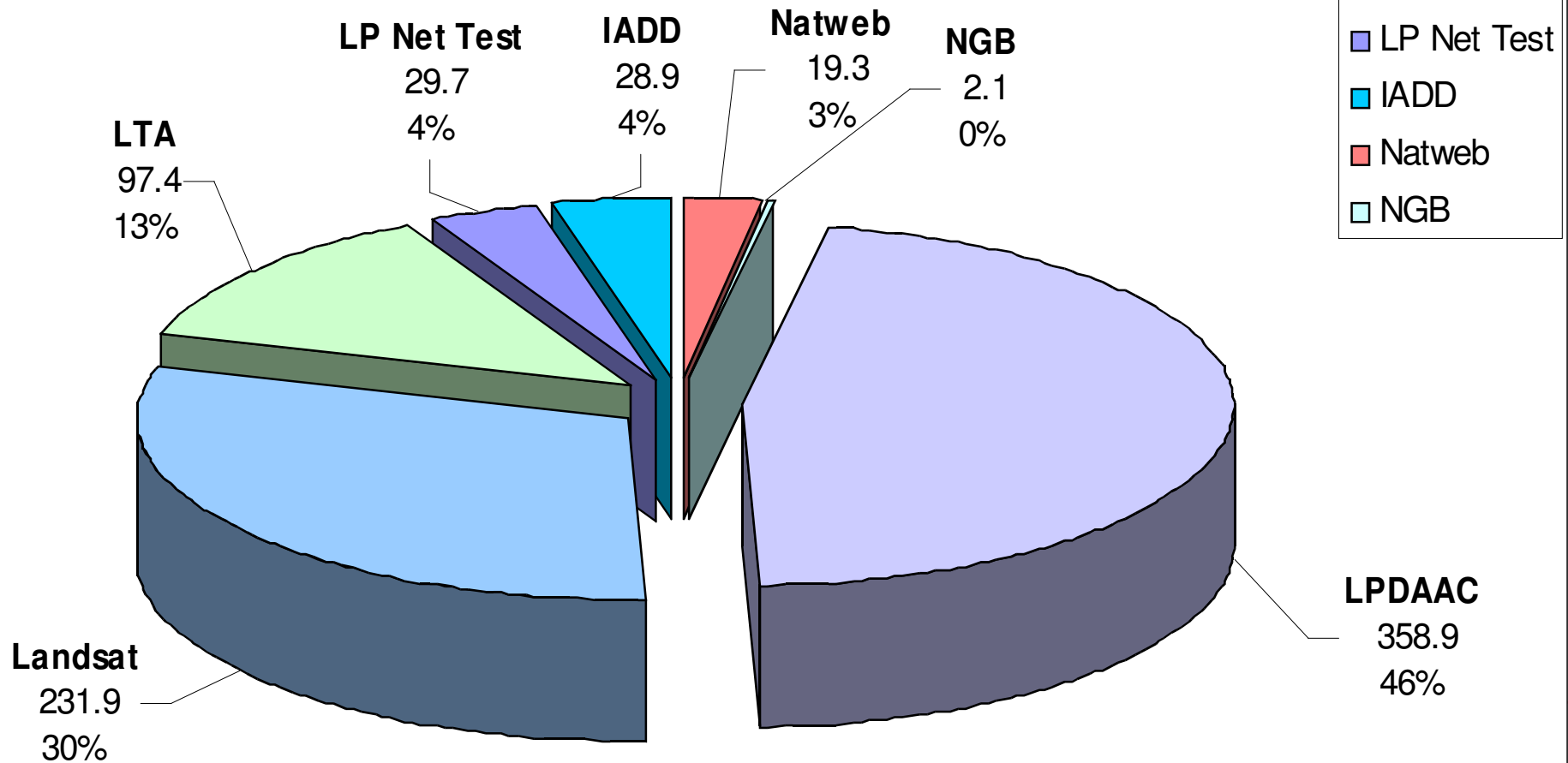

YTD (Jan - June) Distribution (TB)
768.2 Total Distribution

LP Net Test 29.7 4%

IADD 28.9 4%

Natweb 19.3 3%

NGB 2.1 0%

LTA 97.4 13%

LPDAAC 358.9 46%

Landsat 231.9 30%

Legend: LPDAAC, Landsat, LTA, LP Net Test, IADD, Natweb, NGB

ASTER Products

Shortname	Level	ASTER Product	Res (m)
AST_L1BE	1B	Registered Radiance at the Sensor	15, 30, 90
AST_L1AE	1A	Reconstructed Unprocessed Instrument Data - Expedited	15, 30, 90
AST_L1A	1A	Reconstructed Unprocessed Instrument Data	15, 30, 90
ASTGTM	3	ASTER Global Digital Elevation Model	30 grid
AST_07	2	Surface Reflectance - VNIR & SWIR	15, 30
AST_07XT	2	Surface Reflectance - VNIR & Crosstalk Corrected SWIR	15, 30
AST_09	2	Surface Radiance - VNIR & SWIR	15, 30
AST_09XT	2	Surface Radiance - VNIR & Crosstalk Corrected SWIR	15, 30
AST_09T	2	Surface Radiance TIR	90
AST_08	2	Surface Kinetic Temperature	90
AST_05	2	Surface Emissivity	90
AST14OTH	3	Registered Radiance at the Sensor - Orthorectified	15, 30, 90
AST_L1B	1B	Registered Radiance at the Sensor	15, 30, 90
AST14DMO	3	Digital Elevation Model & Registered Radiance at the Sensor - Orthorectified	15, 30, 90
AST14DEM	3	Digital Elevation Model	30

MODIS Products

Shortname	Platform	MODIS Product	Raster Type	Res (m)	Temporal Granularity
MCD45A1	Combined	Burned Area	Tile	500m	Monthly
MOD09GA	Terra	Surface Reflectance Bands 1–7	Tile	500/1000m	Daily
MYD09GA	Aqua	Surface Reflectance Bands 1–7	Tile	500/1000m	Daily
MOD09GQ	Terra	Surface Reflectance Bands 1–2	Tile	250m	Daily
MYD09GQ	Aqua	Surface Reflectance Bands 1–2	Tile	250m	Daily
MOD09CMG	Terra	Surface Reflectance Bands 1–7	CMG	5600m	Daily
MYD09CMG	Aqua	Surface Reflectance Bands 1–7	CMG	5600m	Daily
MOD09A1	Terra	Surface Reflectance Bands 1–7	Tile	500m	8 Day
MYD09A1	Aqua	Surface Reflectance Bands 1–7	Tile	500m	8 Day
MOD09Q1	Terra	Surface Reflectance Bands 1–2	Tile	250m	8 Day
MYD09Q1	Aqua	Surface Reflectance Bands 1–2	Tile	250m	8 Day
MOD13A1	Terra	Vegetation Indices	Tile	500m	16 Day
MYD13A1	Aqua	Vegetation Indices	Tile	500m	16 Day
MOD13A2	Terra	Vegetation Indices	Tile	1000m	16 Day
MYD13A2	Aqua	Vegetation Indices	Tile	1000m	16 Day
MOD13Q1	Terra	Vegetation Indices	Tile	250m	16 Day
MYD13Q1	Aqua	Vegetation Indices	Tile	250m	16 Day
MOD13A3	Terra	Vegetation Indices	Tile	1000m	Monthly
MYD13A3	Aqua	Vegetation Indices	Tile	1000m	Monthly
MOD13C1	Terra	Vegetation Indices	CMG	5600m	16 Day
MYD13C1	Aqua	Vegetation Indices	Tile	5600m	16 Day
MOD13C2	Terra	Vegetation Indices	CMG	5600m	Monthly

MODIS Products

Shortname	Platform	MODIS Product	Raster Type	Res (m)	Temporal Granularity
MYD13C2	Aqua	Vegetation Indices	CMG	5600m	Monthly
MOD44W	Terra	Land Water Mask Derived	Tile	250m	none
MOD11_L2	Terra	Land Surface Temperature & Emissivity	Swath	1000m	5 Min
MYD11_L2	Aqua	Land Surface Temperature & Emissivity	Swath	1000m	5 Min
MOD11A1	Terra	Land Surface Temperature & Emissivity	Tile	1000m	Daily
MYD11A1	Aqua	Land Surface Temperature & Emissivity	Tile	1000m	Daily
MOD11A2	Terra	Land Surface Temperature & Emissivity	Tile	1000m	8 Day
MYD11A2	Aqua	Land Surface Temperature & Emissivity	Tile	1000m	8 Day
MOD11B1	Terra	Land Surface Temperature & Emissivity	Tile	6000m	Daily
MYD11B1	Aqua	Land Surface Temperature & Emissivity	Tile	6000m	Daily
MOD11C1	Terra	Land Surface Temperature & Emissivity	CMG	5600m	Daily
MYD11C1	Aqua	Land Surface Temperature & Emissivity	CMG	5600m	Daily
MOD11C2	Terra	Land Surface Temperature & Emissivity	CMG	5600m	8 Day
MYD11C2	Aqua	Land Surface Temperature & Emissivity	CMG	5600m	8 Day
MOD11C3	Terra	Land Surface Temperature & Emissivity	CMG	5600m	Monthly
MYD11C3	Aqua	Land Surface Temperature & Emissivity	CMG	5600m	Monthly

MODIS Products

Shortname	Platform	MODIS Product	Raster Type	Res (m)	Temporal Granularity
MCD15A2	Combined	Leaf Area Index - FPAR	Tile	1000m	8 Day
MOD15A2	Terra	Leaf Area Index - FPAR	Tile	1000m	8 Day
MYD15A2	Aqua	Leaf Area Index - FPAR	Tile	1000m	8 Day
MOD17A2	Terra	Gross Primary Productivity	Tile	1000m	8 Day
MYD17A2	Aqua	Gross Primary Productivity	Tile	1000m	8 Day
MCD43A3	Combined	Albedo	Tile	500m	16 Day
MCD43B3	Combined	Albedo	Tile	1000m	16 Day
MCD43C3	Combined	Albedo	CMG	5600m	16 Day
MCD43A1	Combined	BRDF-Albedo Model Parameters	Tile	500m	16 Day
MCD43B1	Combined	BRDF-Albedo Model Parameters	Tile	1000m	16 Day
MCD43C1	Combined	BRDF-Albedo Model Parameters	CMG	5600m	16 Day
MCD43A2	Combined	BRDF-Albedo Quality	Tile	500m	16 Day
MCD43B2	Combined	BRDF-Albedo Quality	Tile	1000m	16 Day
MCD43C2	Combined	BRDF-Albedo Snow-free Quality	Tile	5600m	16 Day
MCD43A4	Combined	Nadir BRDF-Adjusted Reflectance	Tile	500m	16 Day
MCD43B4	Combined	Nadir BRDF-Adjusted Reflectance	Tile	1000m	16 Day
MCD43C4	Combined	Nadir BRDF-Adjusted Reflectance	CMG	5600m	16 Day